

ARBUZOV, B.A. Academician (Chem. Inst. Im. A. Ye. Arbuzov, Kazan Affil. AS USSR)

"Methods of Developing Organic Derivatives of Phosphorus" (Puti razvitiya organicheskikh proizvodnykh fosfora)

Chemistry and Uses of Organophosphorous Compounds  
(Khimiya i primeneniye fosfororganicheskikh soedneniy),  
Trudy of First Conference, 8-10 December 1955, Kazan,  
pp. Published by Kazan Affil. AS USSR, 1957

9-17

ARBUZOV, D. A.; FUZHERKOVA, A. V.; VINOGRADOVA, V. E.; TOLKACHEVA, T. G. (Chair  
of Organic Chemistry and NII of Chemistry im. A. M. Butlerov of Kazan State  
University im. V. I. Ul'yanov-Lenin)

"Intermediate Products By the Arbuzov Rearrangement" (Promezhutochnyye produkty  
pri peregrupirovke Arbuzova)

Chemistry and Uses of Organophosphorous Compounds  
(Khimiya i primeneniye fosfororganicheskikh soedneniy),  
Trudy of First Conference, 8-10 December 1955, Kazan,  
pp. 62-75 Published by Kazan Affil. AS USSR, 1957

Report discussed by: B. Ya. Teytel'baum (Chem. Inst. im. Acad. A. Ye. Arbuzov, Kazan Aff.  
AS USSR), M. I. Kabachnik (Inst. Elementary Organic Compounds AS USSR), and V. S.  
Abramov (Kazan Chem. Technological Inst. Im. S. M. Kirov). Experiments mentioned by  
V. S. Abramov were conducted by A. I. Bol'shakova.

ARBUZOV, B. A.; VINOGRADOVA, V. S. (Chem. Inst. im. A. M. Butlerov under the Kazan State University im. V. I. Ul'yanov-Lenin)

"Esters of Beta-Ketophosphinic Acids and Some of the Their Properties" (Efiry Beta-ketofosfinovykh kislot i nekotoryye ikh svoystva)

Chemistry and Uses of Organophosphorous Compounds  
(Khimiya i primeneniye fosfororganicheskikh sovedneniy),  
Trudy of First Conference, 8-10 December 1955, Kazan,  
pp. Published by Kazan Affil. AS USSR, 1957

176-184

Report discussed by A. N. Pudovik (Chem. Inst. im. Acad. A. Ye. Arbuzov, Kazan Affil. AS USSR) and M. I. Kabachnik (Inst. Elem. Organ. Compounds AS USSR, Moscow)

ARR'ZOV, B. A.

ARBUZOV, B. A.

5  
4622  
Insecticide: A. E. Arbutov, B. A. Arbutov, K. V.  
Nikonov, and P. I. Alimov. U.S.S.R. 100,052, June 25,  
1957. An insecticide containing tetraethyl pyrophosphate is  
obtained by the action of  $\text{EtOH}$  on  $\text{P}_2\text{O}_5$ . The resulting  
 $\text{HCl}$  is removed by vacuum. M. ~~Alimov~~

ARBUZOV, B. A.

27 27 7  
Sulfur and selenium analogs of tetraethyl pyrophosphate

A. B. Arbutov, B. A. Arbutov, B. A. Arbutov, and P. I.

127

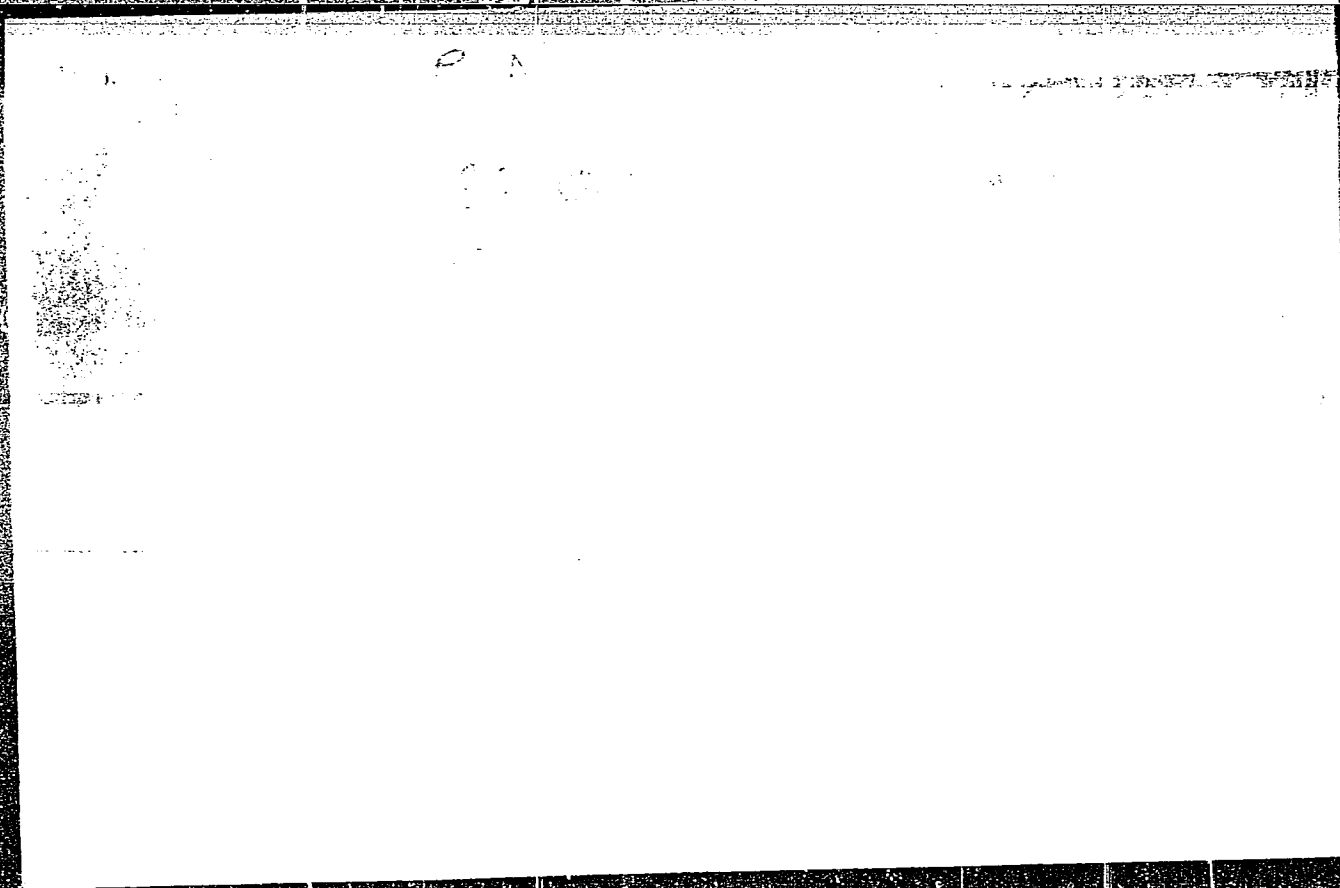
NEPRIMKROV, N.N.; SHARAGIN, A.G.; NUZHIN, M.T., prof., otv. red.; MARKOV, M.T., prof., zamestitel' otv. red.; KASHTANOV, S.G., prof., red.; ARBUZOV, B.A., akademik, red.; AL'TSHULER, S.A., prof., red.; LIVANOV, N.A., prof., red.; NORDEN, A.P., prof., red.; PISAREV, V.I., prof., red.; TIKHVINSKAYA, Ye.I., prof., red.; BARYSHNIKOV, V.G., dots., red.; KOLESNIKOVA, Ye.A., dots., red.; KOLOBOV, N.V., dots., red.; MOROZOV, D.G., dots., red.; KHARITONOV, A.P., dots., red.; YUDIN, I.N., red.; SAMITOV, Yu.Yu., red.

[Investigations of wells and development of preventive paraffin control methods] Issledovanie skavazhiny i razrabotka preventivnykh metodov bor'by s-parafinom. Kazan' 1957. 108 p. (Kazan. Universitet. Uchenye zapiski, vol. 117, no.3). (MIRA 11:5)

1. Rektor Kazanskogo gosudarstvennogo universiteta (for Nuzhin).
  2. Prorektor po nauchnoy rabote Kazanskogo gosudarstvennogo universiteta (for Markov).
  3. Prorektor po uchebnoy rabote Kazanskogo gosudarstvennogo universiteta (for Kashtanov).
  4. Sekretar' partkoma Kazanskogo gosudarstvennogo universiteta (for Yudin).
- (Oil wells) (Petroleum engineering)

"APPROVED FOR RELEASE: 06/05/2000

CIA-RDP86-00513R000101920006-2



APPROVED FOR RELEASE: 06/05/2000

CIA-RDP86-00513R000101920006-2"



[illegible]

ARBUZOV, BA'R; POLOTZ HENSKII, NI.

Fe<sub>2</sub>P<sub>2</sub>, decomp. 270-300°. To 45%  
and 300 ml. P<sub>2</sub>O<sub>5</sub> was added with  
a 10% solution of the latter in

The reaction mixture was  
stirred for 24 hours at 100°C.  
The mixture was then poured  
into 100 ml. of water and the

The mixture was then poured  
into 100 ml. of water and the

described above and org. halides may be the result of initial  
formation of a phosphonium-type adduct of the latter at the  
P atom bound to the R<sub>2</sub> group, followed by the loss of the  
adduct to (RO)<sub>2</sub>P(O)X and R<sub>2</sub>P(O)X.

MA  
MT

ARBUZOV, B. A.

Esters of 2-oxophosphonic acids. II. Esters of aromatic and carboxylic series B. A. Arbutov and T. S. Yudin (Ulyanovsk State Univ., Kazan). *Izv. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1957, 284-91; cf. C.A. 49, 13925g, 51, 10005c. The differences in phys. properties of oxaphosphonates prepared by different methods are examined, and the reasons for the differences are discussed. 1. 15% of  $\text{H}_2\text{O}$  in the reaction mixture of  $\text{H}_2\text{O}$  and  $\text{H}_2\text{O}$  at  $130^\circ$  gave 17.5 g.  $\text{H}_2\text{O}$  and 2.1 g.  $\text{H}_2\text{O}$  product, b.p.  $157-158^\circ$ , and 39.5 g.  $\text{H}_2\text{O}$  product, b.p.  $157-158^\circ$ ,  $n_D^{20}$  1.5120,  $d_4^{20}$  1.1650; Meyer Br titration of the product gave 9.1% anisatn. in the ester (this is compared with 9.1% in  $\text{H}_2\text{O}$ ,  $\text{CO}_2\text{Et}$ ) indicative of enol content. 1 gives a brown-orange color with  $\text{FeCl}_3$ ; its absorption spectrum in the ultraviolet is shown,  $\lambda$  2420, 2600, and 3200 Å, being nearly a duplicate of the spectrum of  $\text{AcPh}$  or  $\text{BzCMe}_2\text{Ac}$ , indicative of the predominant effect of the  $\text{Br}$  group on the spectrum. The  $\lambda$  3200 is referred to the  $\text{CO}$  group of  $\text{BzCMe}_2\text{Ac}$ , and  $\lambda$  2420 is produced by the  $\text{H}_2\text{O}$  group of  $\text{H}_2\text{O}$  and  $\text{H}_2\text{O}$  in  $\text{MeONa}$ .

101

a. In the presence of  
b. In the presence of  
c. In the presence of  
its behavior, however, from the point of view of phosphorus  
Addition of 1-2% of phosphorus

it gave no color with  $\text{FeCl}_3$  and showed  $\lambda$  2450 Å. (strong)  
and absence of absorption at 2450 Å. from the point of view of phosphorus

Don't forget; bromocamphor failed to react with  $(EtO)_3P$   
at  $120^\circ C$  C. M. R. 11

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

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CIA-RDP86-00513R000101920006-2"

*M.O.* 5, 180-1°, 1.4510, 1.2012. G. A. Kosolapoff

*pm amf*



AUTHORS: Arbuzov, B. A., and Vinogradova, V. S.

62-1-8/21

TITLE: Esters of Beta-Ketophosphinic Acids (Beta-Ketophosphinates) Part 1. Phosphonacetic Ester, Phosphonacetone and their Homologues (Efiry beta-ketofosfinovykh kislot, Soobshcheniye 1. Fosfonuksusnyy efir, fosfonatseton i ikh gomologi)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Khimicheskikh Nauk, 1957, No. 1, pp. 54-64 (U.S.S.R.)

ABSTRACT: Data are presented on the synthesis of certain substituted derivatives of phosphonacetic ester, phosphonacetone and its methyl derivatives and the results obtained during the titration of these compounds with bromine. The three methods employed in the synthesis of these compounds are : A, reaction of alpha-halogeno-carbonyl compounds with phosphorous acid esters (the A. Ye. Arbuzov regrouping); B, reaction of dialkylphosphites with alphas-halogeno-carbonyl compounds (Michael's-Becker reaction); and C, alkylation of the metallic derivatives of beta-phosphoncarbonyl compounds with alkyl halides. The constants and properties of the compounds obtained by the three different methods were found to be quite different. It was found that the amount of phosphoric ester

Card 1/3

62-1-8/21

Esters of Beta-Ketophosphinic Acids (Beta-Ketophosphinates) Part 1.  
Phosphonacetic Ester, Phosphonacetone and their Homologues

obtainable depends upon the reaction temperature and nature of the halide, high temperature aids the formation of ketophosphinic acid ester, lower temperature promotes formation of phosphoric ester.

The chloro-derivatives sometimes yield an unsaturated phosphoric ester; the formation of unsaturated phosphoric acid esters explains the abnormal case of unsaturation in the di-substituted compounds. The enol content in the phosphonacetic and methylphosphonacetic esters, determined by the bromine titration method, is explained by the presence of hardly-separable small amounts of unsaturated phosphoric acid ester. Considerable enolization takes place in alkali media.

Card 2/3 Tables, graphs. There are 24 references, of which 10 are Slavic.

62-1-8/21

Esters of Beta-Ketophosphinic Acids (Beta-Ketophosphinates) Part 1.  
Phosphonacetic Ester, Phosphonacetone and their Homologues

ASSOCIATION:

The Kazan' State University imeni V. I. Ul'yanov-Lenin, Institute  
of Chemistry imeni A. M. Butlerov.

PRESENTED BY:

SUBMITTED:

January 12, 1956

AVAILABLE:

Library of Congress

Card 3/3

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**CIA-RDP86-00513R000101920006-2**

**APPROVED FOR RELEASE: 06/05/2000**

**CIA-RDP86-00513R000101920006-2"**

D<sub>1</sub> 64-6° 1.1226, 1.4445, 1.1817, 1.4395,  $\text{PROP(OCCH}_3\text{)}$   
4° 1.0830, 1.4348,  $\text{PROP(OCCH}_3\text{)}$ , b. 71-2° 1.0819  
1.4470,  $\text{H}_2\text{C(OCCH}_3\text{)}$ , b. 71-2° 1.0819  
 $\text{H}_2\text{C(OCCH}_3\text{)}$ , b. 71-2° 1.0819  
Curves showing b. 71-2° 1.0819

(CH<sub>3</sub>)<sub>2</sub>CO, no effect observed and decompn. took place (CH<sub>3</sub>)<sub>2</sub>CO

Arbuzov, B. A.

30-8-8/37

AUTHOR: Arbuzov, B.A., Academician

TITLE: The Annual Meeting of the British Society for Chemistry  
(Godichnoye sobraniye Angliyskogo khimicheskogo obshchestva)

PERIODICAL: Vestnik Akademii Nauk SSSR, 1957, Vol. 27, Nr 7, pp. 57-59 (USSR)

ABSTRACT: By invitation of the above mentioned society the author took part in the annual meeting (9 - 12 April 1957) at Cambridge. Three groups were at work. The themes were: "The Ethers of Phosphoric Acid"; "The Reaction of Free Radicals in the Gaseous State"; "Present-Day Notions of the Anorganic Chemistry of Nitrogen". The theme "Ethers of Phosphoric Acid" was not just selected by chance; the head of the symposium, Sir A. Todd, acquired world-fame by his work within the field of the synthesis of nucleothides. After an introductory address by Sir A. Todd, F.H. Westheimer (U.S.A.) spoke about the investigation of the solvolysis of some phosphorus ethers. On this occasion he stressed the fact that it is extremely easy to carry out the hydrolysis of ethylene glycole ether, which is the reason why the rapidity of this reaction exceeds the hydrolysis of dimethyl phosphorus ether by  $10^7$  ( $10^7$ ). In the USSR chemical research work achieved

Card 1/2

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obviously oxidation-reduction course of  
is not dependent

ARBUZOV, B.A.; BOGONOSTSEVA, N.P.

Synthesis of some phosphosulfides and phosphosulfones. Zhur. ob.  
khim. 27 no.9:2360-2362 S '57. (MIRA 11:3)

1. Khimicheskiy institut pri Kazanskom gosudarstvennom universitete.  
(Chemistry, Organic--Synthesis)  
(Sulfides)  
(Sulfones)

ARBUZOV, B.A., akademik; FRINOVSKAYA, V.A.

Oxides of some  $\alpha$ -pinene derivatives and their isomerization.  
Dokl. AN SSSR 112 no.3:427-429 Ja '57.

(MLRA 10:4)

1. Nauchno-issledovatel'skiy khimicheskiy institut im.  
A.M. Butlerova pri Kazanskom gosudarstvennom universitete im.  
V.I. Ul'yanova-Lenina.  
(Pinene) (Isomerization)

AUTHOR: ARBUZOV, B.A., FUZHENKOVA, A.V. 20-6-23/59  
TITLE: Interaction between Phosphorus Ethers and Alkyl Halides Studied  
by means of Physical-Chemical Analysis. (Izucheniye vzaimodeystviya  
efirov fosforistoy kisloty s galoidnymi alkilami metodami fiziki-  
khimicheskogo analiza, Russian)  
PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol 113, Nr 6, pp 1269-1271  
(U.S.S.R.)  
ABSTRACT: The rearrangement mechanism by A.Ye.ARBUSOV has already been  
studied since 50 years. According to his opinion the rearrangement  
of phosphites into ethers of the alkylphosphin acids are an inter-  
mediate stage, on which occasion an intermediate product of the  
phosphonium type develops. This is experimentally proved for  
aromatic phosphites. According to one opinion such intermediate  
products collapse immediately and automatically. Some scientists,  
however, maintain that the rearrangement in question can occur  
according to another mechanism without affixing the alkyl halide  
to the phosphite. Here results are described which were obtained  
on the occasion of the investigation of ARBUSOV's rearrangement by  
means of the physical-chemical analysis method. The main task was  
to show the possibility as to how the diagram composition-property  
can be used for the study of the problem of the formation of an  
intermediate product. The interaction between triethylphosphite

Card 1/2

AUTHOR ARBUZOV, B.A., FUZHENKOVA, A.V. 20-1-24/64  
 TITLE The investigation of the Re-Grouping according to A. B. ARBUZOV by the Thermographic Method.  
 (Izucheniye peregruppirovki A. B. Arbuzova metodom termografii.- Russian)  
 PERIODICAL Doklady Akademii Nauk SSSR 1957, Vol 114, Nr 1, pp 89-92, p (U.S.S.R.)  
 ABSTRACT Arbuzov, who discovered the re-grouping of phosphorus ethers, as well as of the ethers of alkyl phosphine acids under the influence of galoid alkiles assumed that regrouping takes place by the formation of the intermediate product by the coupling of the galoid alkile to the trivalent phosphorus. For aromatic phosphites the formation of the intermediate product by separation was proved. For aliphatic phosphites a separation of the intermediate products is not possible (apparently because they do not keep). The results obtained by ARBUZOV when investigating re-grouping by the thermographic method are described. By this method it is possible, without difficulties, to prove the development of processes occurring as a result of liberation and absorption of heat. In order to check the possibilities offered by the thermographic method thermograms

CARD 1/2

AUTHORS:

Arbuzov, B. A., Kh'smatullina, A. G.

62-2-6/28

TITLE:

On the Structure of the Resin Acids of Turpentine From  
Pinus Pithyusa in Pinus Insignis (O sostave smolyanykh  
kislot zhivitsy pinus pithyusa y pinus insignis).

PERIODICAL:

Izvestiya AN SSSR Otdeleniye Khimicheskikh Nauk, 1958, Nr 2,  
pp. 166-173 (USSR).

ABSTRACT:

Numerous researchers for many decades dealt with the structure of the above-mentioned resin acids and their elimination. The investigation of these acids, however, meets with great difficulties due to their easy variability. The property of these acids to form mixed crystals also renders the investigation very difficult. After a number of successfully employed methods the discovery was made that a small quantity of resin acids, separate from each other, exists in the sap of various Coniferae. A new acid, palustric acid (reference 4) is now added to the already discovered ones. As Garris (reference 5) already proved, abietic acid is the primary acid. The elaboration of the quantitative methods of the determination of individual resin acids of turpentine showed that individual resin acids which were eliminated from the sap (in

Card 1/2

On the Structure of the Resin Acids of Turpentine From  
Pinus Pithyusa in Pinus Insignis.

62-2-6/28

very small quantities) constitute an important part of this sap. For this reason it was of interest to find out how the resin acids are composed in a quantitative and qualitative respect. The present paper gives the results of this research. Thus the composition of the above-mentioned resin acids of turpentine of P. pithyusa was investigated. This composition of the crystallized and dissolved part of the resin acids of turpentine is similar. They contain: laevopimaric acid 8%, abietinic acid 35%, neoabietinic acid 8%, isodextropimaric acid and others 15% respectively. In P. insignis: The resin acids of turpentine contain laevopimaric acid 35%, abietinic acid 6,5%, neoabietinic acid 14% and dextropimaric acid 24%. There are 7 figures, 2 tables, and 12 references, 5 of which are Slavic.

ASSOCIATION: State University imeni V.I. Ul'yanov-Lenin, Kazan' (Kazanskiy gosudarstvennyy universitet imeni V.I. Ul'yanova-Lenina).  
SUBMITTED: October 16, 1956  
AVAILABLE: Library of Congress

Card 2/2

1. Resin acids-Analysis

AUTHORS:

Arbuzov, B. A., Rizpolozhenskiy,  
N. I., Zvereva, M. A.

SOW/62-58-6-9/37

TITLE:

The Esters of Ethyl-Phosphinic Acid and Some of Its Transformations (Efiry etilfosfinistoy kisloty i ikh nekotoryye prevrashcheniya) Communication 8. Mixed Anhydrides of Dialkyl-Phosphoric Acid, Ethyl-Phosphinic Acid, and Diethyl-Phosphinic Acid (Soobshcheniye 8. Smeshannyye angidridy dialkilfosforistoy, etilfosfinistoy i dietilfosfinistoy kislots)

PERIODICAL:

Izvestiya Akademii nauk SSSR, Otdeleniye khimicheskikh nauk, 1958, Nr 6, pp. 706-712 (USSR)

ABSTRACT:

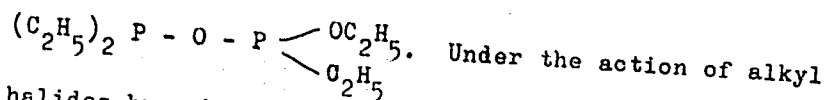
Kosolapov and Watson (Uotson) (Ref 1) were the first to obtain anhydrides of di-n.-propylic and di-n.-butyl phosphinic acid as a result of the action of the chlorine anhydride of dialkyl phosphinic acid upon the esters of this acid. Later, the same authors (Ref 2) obtained anhydrides of dimethyl- and diethyl phosphinic acid. In the present paper the authors describe the method of obtaining mixed anhydrides of the type  $(Et)_2P-O-P(OH)_2$  ( $R=C_2H_5$ ;  $C_3H_7-n$ ;  $C_3H_7-1$ )<sub>4</sub>

Card 1/5  
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The Esters of Ethyl-Phosphinic Acid and Some of Its Transformations. Communication 8. Mixed Anhydrides of Dialkyl-Phosphoric Acid, Ethyl-Phosphinic Acid, and Diethyl-Phosphinic Acid.

SOV/62-58-6-9/37



Under the action of alkyl halides brought to bear upon the mixed anhydrides tetraalkylhalidephosphonium is formed. Under the action of sulphur the mixed anhydrides combine only with a sulphur atom (and sulphur combines with phosphorus which contains 2 ethyl radicals). There are 2 tables and 3 references.

ASSOCIATION:

Khimicheskiy institut im. A. Ya. Arbuzova, Kazanskogo filiala AN SSSR (Chemical Institute imeni A. Ye. Arbuzov Kazan' Branch, AS USSR)

SUBMITTED:

December 21, 1956

Card 2/5  
2

5(3)

AUTHORS:

Arbuzov, B. A., Zoroastrova, V. M.

SOV/62-58-11-9/26

TITLE:

Esters of Phosphoric and Thiophosphoric Acids Containing Heterocyclic Radicals (Efiry fosfornoy i tiofosfornoy kislot, soderzhashchiye geterotsiklicheskiye radikaly) Communication I. Compounds Containing Pyrimidine and Imidomethyl Uracil Radicals (Soobshcheniye 1. Soyedineniya s pirimidinovyim i imidometiluratsilovym radikalami)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1958, Nr 11, pp 1331-1339 (USSR)

ABSTRACT:

In the present paper the authors synthesized a number of esters of the phosphoric and thiophosphoric acids with pyrimidine and imidouracil radicals. The physical properties of the obtained products are given (Table 1). Compounds Nr 1 and 2 are high-boiling, viscous, oily liquids easily soluble in the ordinary organic solvents and difficultly soluble in water. Compound Nr 2 was described by Shvetsova-Shilovskaya, Mel'nikov, and Grapov (Ref 2). Compound Nr 4 was obtained in liquid as well as also in crystalline state. The other compounds containing the pyrimidine radical, are low-melting solids. Products Nr 3, 4, 5 were obtained in good yields from

Card 1/3

Esters of Phosphoric and Thiophosphoric Acids  
Containing Heterocyclic Radicals.  
Communication I. Compounds Containing Pyrimidine and  
Imidomethyl Uracil Radicals

SOV/62-58-11-9/26

the Na-salt of 2-phenyl-4-methyl-6-oxypyrimidine. Under the selected conditions no compound with the imidouracil radical could be obtained from Na-salt. They were produced by the interaction of Ag-salt and the acid chloride of dialkyl phosphoric acid in dry toluene or xylol in a yield of from 51.6 to 57.8 %. These compounds are low-melting crystalline solids. They are easily soluble in organic solvents, less easily soluble in water. It is a characteristic feature of all compounds that in compounds with an ethyl radical solubility in water is better than in compounds with normal and isobutyl radicals. The authors tried to obtain n-butyl ester (Nr 7) according to the method described (Ref 2). On this occasion, however, a product was separated which according to its analysis corresponded to the acid imidomethyl uracil butyl ester. Individual synthesized esters were saponified. In the course of saponification with hydrochloric acid (1:1) usually initial pyrimidines or imidomethyl uracil could be separated. Some of the synthesized compounds were examined by M. A.

Card 2/3

Esters of Phosphoric and Thiophosphoric Acids  
Containing Heterocyclic Radicals.  
Communication I. Compounds Containing Pyrimidine and  
Imidomethyl Uracil Radicals

SOV/62-58-11-9/26

Kudrina at the Kazanskiy filial Akademii nauk SSSR (Kazan'  
Branch of the Academy of Sciences USSR) with respect to  
their insecticide properties on *Calandra granaria* L. and to  
toxic properties on mice. The results are shown (Table 2).  
There are 2 tables and 4 references, 1 of which is Soviet.

ASSOCIATION: Khimicheskiy institut im. A. M. Butlerova Kazanskogo  
gosudarstvennogo universiteta im. V. I. Ul'yanova-Lenina  
(Chemical Institute imeni A. M. Butlerov, Kazan' State  
University imeni V. I. Ul'yanov-Lenin)

SUBMITTED: March 21, 1957

Card 3/3

5(3)

AUTHORS:

Arbuzov, B.A., Ukhvatova, E.N.

SOV/62-58-11-22/26

TITLE:

On the Reaction of Trialkyl Phosphites With Nitrosyl Chloride and Nitroxyl Chloride (O reaktsii trialkilfosfitov s khloristym nitrozilom i khloristym nitrilom)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1958, Nr 11, pp 1395 - 1396 (USSR)

ABSTRACT:

In this brief paper the authors report on the ascertainment that in an interaction between trialkyl phosphites and nitrosyl chloride and nitroxyl chloride mainly an oxidation of trialkyl phosphites into corresponding phosphates takes place. In the case of the reaction of triethyl phosphite with nitroxyl chloride apart from triethyl phosphate also a smaller quantity of a fraction was precipitated which corresponds to the tetraethyl pyrophosphate both according to the constants and the analysis. In the case of nitrosyl chloride a similar fraction was precipitated, which contained smaller quantities of phosphorus, though. In the case of higher homologs of phosphites the authors did not succeed in precipitating pyrophosphates, since the distillation of high-boiling reaction products leads to their decomposition. There are 4 references, 1 of which is Soviet.

~~Card 1/2~~

*Sci Res Inst. Chemistry in A.M. Buttarov, Kazan' State Univ*

AUTHORS:

Arbuzov, B. A., Member, Academy of Sciences, USSR,  
Isayeva, Z. G. SOV/20-121-1-28/55

TITLE:

On the Reduction of the  $\Delta^3$ -Carene Oxide (O vosstanovlenii  
okisi  $\Delta^3$ -karena)

PERIODICAL:

Doklady Akademii nauk SSSR, 1958, Vol. 121, Nr 1, pp. 105-106  
(USSR)

ABSTRACT:

It is known that the oxide mentioned in the title may be reduced to an alcohol ( $C_{10}H_{18}O$ ). When the authors investigated the hydration of this oxide they found that two further products with the same formula are produced from it. The first alcohol is apparently identical with the 1-caranol of Kuczyuski and Chabudzinski (Kuchinskiy and Khabudzinskiy) (Ref 2). An alcohol which was obtained by the authors from reduction of the 1-caranone-3 (purified twice with p-nitrobenzoate and the acid phthalic ether) has constants which are very close to the alcohol produced by the authors (purified by 3,5-dinitrobenzoate). The two alcohols differ only by the melting point of the acid phthalic ether. In consequence of the oxidation of the

Card 1/3

On the Reduction of the  $\Delta^3$ -Carene Oxide

SOV/20-121-1-28/55

$\Delta^3$ -oxide-hydration product by chrome anhydride in acetic acid a ketone  $C_{10}H_{16}O$  was obtained which yields semicarbazide (melting point  $201 - 202^\circ$ ) in a quantitative yield. This ketone is according to its constants and its melting temperature identical with the 1-caranone-3 (Ref 2) which is an isomerization product of the  $\Delta^3$ -carene-oxide by sodium in benzene. The same ketone was obtained by the authors (in a low yield) from the dehydration reaction of the  $\beta$ -carene-glycol by p-toluene-sulfochloride in pyridine. In order to be able to give a final identification of the initially mentioned product, the authors produced it by the action of sodium upon the  $\Delta^3$ -carene-oxide in benzene. From the alcohol reactions 3,5-dinitrobenzoate of the 1-caranol-3 (from alcohol) and an acid phthalic ether were obtained. Since these two compounds did not show a temperature depression of mixed samples with corresponding derivatives of the  $\Delta^3$ -carene-oxide hydration product one of the products of the catalytic hydration of the last mentioned oxide is bound to be 1-caranol-3. A further alcohol existed in the reaction products; it turned out to be caranol-4, could, however, not be isolated. It might be one of the 4 possible stereoisomers of caranol-3.

Card 2/3

On the Reduction of the  $\Delta^3$ -Carene Oxide

SOV/20-121-1-28/55

The reduction of the  $\Delta^3$ -carene-oxide with  $\text{LiAlH}_4$  yielded caranol-4 (Ref 2). There are 8 references, 1 of which is Soviet.

SUBMITTED: April 17, 1958

1. Terpenes--Chemical properties
2. Organic oxides--Reduction
3. Alcohols--Synthesis

Card 3/3



AUTHORS:

Arbuzov, B. A., Member, Academy of Sciences, USSR, Vinogradova, V. S., Polezhayeva, N. A. SOV/20-121-4-19/54

TITLE:

On the Structure of the Products of the Interaction Between Some  $\alpha$ -Haloid Ketones of the Carbocyclic Series and Triethyl Phosphite and Sodium Diethyl Phosphite (O stroenii produktov vzaimodeystviya nekotorykh  $\alpha$ -galoidoketonov karbo-tsiklicheskogo ryada s trietilfosfitom i dietilfosforistym natriyem)

PERIODICAL:

Doklady Akademii nauk SSSR, 1958, Vol. 121, Nr 4, pp. 641 - 643 (USSR)

ABSTRACT:

In the course of the past years the authors found that the reaction of regrouping according to Arbuzov of triethyl phosphite with  $\alpha$  halide ketones proceeds in a very complicated way in the production of  $\beta$ -ketophosphinic acid ethers. Apart from the mentioned ethers mixed phosphoric ethers are formed (Ref 2). Thus the investigation of the first mentioned ethers was rendered more difficult and some deviations of their chemical and physical properties were explained (Ref 3). It proved true that the reaction according

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On the Structure of the Products of the Interaction SOV/20-121-4-19/54  
Between Some  $\alpha$ -Haloid Ketones of the Carbocyclic Series and Triethyl  
Phosphite and Sodium Diethyl Phosphite

to Mikhaelis-Bekker in the case of the interaction between sodium diethyl phosphite and  $\alpha$ -haloid ketones proceeds also in a complicated way and that it also leads to the formation of epoxy phosphinic acid ethers apart from the expected ethers (Ref 4). In this paper the structure mentioned in the title is shown. The ketones are:  $\alpha$ -chloro-cyclohexanone,  $\alpha$ -chloro- $\alpha$ -methyl cyclohexanone,  $\alpha$ -chloro-cyclopentanone and ethers of bromine pyruvic acid. The investigation of the product of interaction between  $\alpha$ -chloro-cyclohexanone and sodium diethyl phosphite revealed (in contrast to Ref 6) that it is neither an unsaturated ether of phosphoric acid nor a phosphonium cyclohexanone ether. Its spectrum of combination light dispersion does not contain the frequency of the carbonyl group. These and other data show that this product has the structure of a diethyl ether of epoxy cyclohexane phosphinic acid. This assumption was proved by the synthesis carried out by the authors (Ref 4). Thus it was proved that the last mentioned ether was concerned and no  $\alpha$ -phosphonium cyclohexanone. Somehow surprising was the

Card 2/4

On the Structure of the Products of the Interaction  
Between Some  $\alpha$ -Haloid Ketones of the Carbocyclic Series and Triethyl  
Phosphite and Sodium Diethyl Phosphite SOV/20-121-4-19/54

similarity between the constants and the spectra of the combination light dispersion of the products of the two phosphites mentioned in the title acting upon  $\alpha$ -chloro- $\alpha$ -methylcyclohexanone. The mentioned findings show the complicated process taken by this reaction. It leads to the formation of unsaturated phosphoric acid ethers, ethers of epoxy phosphinic acids, in some cases, however, even of  $\beta$ -ketophosphinic ethers (Ref 4); this depends on the nature of the haloid, the conditions of reaction and the substituting alkyl radicals. There are 5 references, 5 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy khimicheskiy institut im.A.M. Butlerova pri Kazanskom gosudarstvennom universitete im. V.I.Ul'yanova-Lenina (Scientific Chemical Research Institute imeni A.M.Butlerov, State University imeni V.I.Ul'yanov-Lenin, Kazan')

Card 3/4  
3

AUTHORS:

Arbuzov, B.A., Member, AS USSR, Isayeva, Z.G. SOV/20-122-1-19/44

TITLE:

Reaction Products of  $\alpha$ -Pinene Oxide and  $\Delta^3$  Carene Oxide  
With Acetic Anhydride (O produktakh reaktsii okisey  $\alpha$ -pinena  
i  $\Delta^3$ -karena s ukkusnym anhidridom)

PERIODICAL:

Doklady Akademii nauk SSSR, 1958, Vol.122, Nr 1, pp. 73-76  
(USSR)

ABSTRACT:

The authors continued their research on this subject as well as on the same reaction of the camphene oxide. It could be proved that the reaction of these bicyclic terpene oxides proceeds on a complicated way. Mixtures of products are formed, and an isomerization of the oxides takes place. The present paper is intended to clear the structure of the acetates which have been produced from the above oxides. As previously reported (Ref 3), the yield of the acetate  $C_{12}H_{18}O_2$  with  $\alpha$ -pinene oxide does not surpass 30 %, whereas in the case of  $\Delta^3$  carene oxide it remains below 22 %. The authors have performed the first reaction in the presence of  $NaHCO_3$ , in order to conduct the formation of the acetates  $C_{12}H_{18}O_2$  mainly in the direction of the suggested scheme. The latter salt binds the acetate ions and reduces the formation of acetate-diols to a minimum.

Card 1/4  
3

Reaction Products of  $\alpha$ -Pinene Oxide and  
 $\Delta^1$  Carene Oxide With Acetic Anhydride

SOV/20-122-1-19/44

By this, it was proved that the  $\alpha$ -pinene oxide could be recovered unchanged to 40 %; the isomerization of the oxide to a "campholene" aldehyde occurred to a much lower extent. Instead of the expected acetate, however, an alcohol  $C_{10}H_{16}O$  (yield 28 %) was isolated which is identical with the di-trans-carveol (Ref 4). By oxidation of this alcohol by means of chromium anhydride in acetic acid, carvone was obtained. According to the statements of reference 3 the boiling point of the acetate from  $\alpha$ -pinene oxide is found in a broad temperature range. By repeated fractionation, apart from "campholene" aldehyde and sobrerol acetate 3 further substances with the same empirical formula  $C_{12}H_{18}O_2$  with a total yield of 31 % were isolated: 1) A product with lower boiling point (79 - 80°/3mm) and with a double-bond in the molecule. By its saponification with 7 % NaOH solution in alcohol-water an alcohol with a ring consisting of 4 links was produced, which rather might be identical with a pinocarveol (II) or still more with the trans-pinocarveol (Ref 7). 2) A somewhat higher boiling (87-87,5°/3mm) product  $C_{12}H_{18}O_2$  with two double-bonds. By saponification with 10 % NaOH solution in alcohol-water an alcohol similar to the trans-carveol resulted.

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Reaction Products of  $\alpha$ -Pinene Oxide and  
 $\Delta^3$  Carene Oxide With Acetic Anhydride

SOV/20-122-1-19/44

3) The boiling point of the third product  $C_{12}H_{18}O_2$  was still higher ( $89-89.5^\circ/3$  mm). The investigation of the latter is continued. The reaction of the  $\Delta^3$  carene with acetic anhydride does not proceed smoothly. The products of reaction consist of:  
1) The hydrocarbon fractions (3,5%) and 2) the products containing carbonyl (7%). They will further be investigated. There are 11 references, 4 of which are Soviet.

ASSOCIATION: Khimicheskiy institut im. A. M. Butlerova pri Kazanskom gosudarstvennom universitete im. V. I. Ul'yanova-Lenina (Chemistry Institute imeni A. M. Butlerov of the Kazan' State university imeni V. I. Ul'yanov-Lenin)

SUBMITTED: May 7, 1958

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3

5(3)

PHASE I BOOK EXPLOITATION

SOV/2148

Arbuzov, Boris Aleksandrovich, Academician

Fosfororganicheskiye soedineniya (Organic Phosphorus Compounds) Moscow, Izd-vo "Znaniya," 1959. 15 p. (Series: Vsesoyuznoye obshchestvo po rasprostraneniyu politicheskikh i nauchnykh znaniy. Seriya IX, 1959, vyp. 5) 37,000 copies printed.

Sponsoring Agency: Vsesoyuznoye obshchestvo po rasprostraneniyu politicheskikh i nauchnykh znaniy.

Ed.: I. B. Faynboym; Tech. Ed.: Ye. V. Savchenko.

PURPOSE: The booklet is intended for the general reader.

COVERAGE: The booklet discusses the progress of chemical investigations of organic compounds. The author gives essential information on the use of these compounds in agriculture (insecticides), in medicine (for treatment of glaucoma, paralysis), and in the manufacture of plastic materials

Card 1/2

5(3)

AUTHORS:

Arbuzov, B. A., Vinogradova, V. S., Polezhayeva, N. A. SOV/62-59-1-7/38

TITLE:

Esters of  $\beta$ -Ketophosphinic Acids (Efiry  $\beta$ -ketofosfinovykh kislot) Communication III. On the Structure of Products Resulting From Interaction Between Certain Halogen Ketones With Triethyl Phosphite and Sodium Diethyl Phosphite (Soobshcheniye 3. O stroyenii produktov vzaimodeystviya nekotorykh galoidoketonov s trietilfosfitom i dietilfosforistym natriyem)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 1, pp 41 - 49 (USSR)

ABSTRACT:

In the preceding papers (Refs 1-3) the authors found that the esters of  $\beta$ -ketophosphinic acid synthesized in various ways differ considerably as to their physical constants as well as to their behavior towards dinitro-phenyl hydrazine. The differences are particularly evident in ultraviolet spectra. The causes for these differences, however, have not yet been made clear. In order to obtain preparations as pure as possible the authors of this paper distilled preparations earlier obtained as well as new ones in rectification columns with an efficiency of 17 theoretical plates.

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Esters of  $\beta$ -Ketophosphinic Acids. Communication III. SOV/62-59-1-7/38  
On the Structure of Products Resulting From Interaction Between Certain  
Halogen Ketones With Triethyl Phosphite and Sodium Diethyl Phosphit.

The constants of the pure preparations are given in table 1 .  
Ultraviolet absorption spectra were recorded by means of  
the spectrometer SF-4 in methyl alcohol solution. Raman  
spectra were recorded by means of the three-prism spectro-  
graph ISP-51. The investigations carried out have shown  
the following data: on the effect of triethyl phosphite  
on chloro and bromo acetone (beside isopropyl ester of the  
diethyl phosphoric acid) as well as on bromoethyl ketone  
esters of corresponding  $\beta$ -ketophosphinic acids are formed.  
Products of potassium derivatives of phosphonium acetone  
and methyl-phosphonium acetone, which were synthesized by  
methylation with methyl iodide, possess the structure of  
esters of the  $\beta$ -ketophosphinic acid. On the effect of  
sodium diethyl phosphite on chloro and bromo acetone as  
well as on bromo- $\alpha$ -bromo-ethyl ketone esters of the epoxy  
phosphinic acid are formed. Their structure was confirmed  
by a synthesis carried out in another way and by Raman  
spectra. Contrary to Kreutzkamp's and ~~Kayser~~'s data, not  
the unsaturated isopropyl ester of phosphoric acid is

Card 2/3

Esters of  $\beta$ -Ketophosphinic Acids. Communication III. SOV/62-59-1-7/30  
 On the Structure of Products Resulting From Interaction Between Certain  
 Halogen Ketones With Triethyl Phosphite and Sodium Diethyl Phosphite

produced on the effect of sodium diethyl phosphite on chloro and bromo acetone, but the ethyl ester of epoxy-propyl phosphinic acid as well as phosphonium acetone. The product synthesized by the interaction of methyl- $\gamma$ -chloro-propyl ketone with sodium dialkyl phosphite possesses the structure of the ester of 1-methyl-tetrahydrofuran phosphinic-1-acid. There are 1 figure, 2 tables, and 13 references, 8 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy institut im. A. M. Butlerova  
 Kazanskogo gosudarstvennogo universiteta im. V. I. Ul'yanova-Lenina (Scientific Research Institute imeni A. M. Butlerov of the Kazan' State University imeni V. I. Ul'yanov-Lenin)

SUBMITTED: May 11, 1957

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Esters of  $\beta$ -Ketophosphinic Acids. Communication 4. SOV/62-59-2-13/40  
Infrared Spectra of Reaction Products of  $\alpha$ -Halogen  
Ketones With Triethyl Phosphite and Sodium Diethyl Phosphite

The spectra were obtained on the double beam infrared spectrophotometer which had been constructed on the basis of the monochromator IKS-11 in the works FIAN (Ref 3). The preparations were supplied by V. S. Vinogradova. The investigation of the infrared spectra of reaction products of bromo-acetone, methyl- $\alpha$ -bromo-ethyl ketone and bromo-methyl-ethyl ketone with triethyl phosphite confirmed their structure to be that of esters of the  $\beta$ -ketophosphinic acids (absorption band 5.84-5.85 $\mu$  of the carbonyl group). The spectra of products of bromo-acetone and methyl- $\alpha$ -bromo-ethyl ketone with sodium diethyl phosphite have shown that they possess the structure of esters of the epoxy phosphinic acids. This is shown by the missing absorption band of the carbonyl group and the presence of an absorption band 11.80, 11.98 $\mu$  being characteristic of the epoxy group. Conclusions as to the presence of enolization could not be drawn for the esters investigated on the basis of their infrared spectra. There are 8 figures and 6 references, 4 of which are Soviet.

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Esters of  $\beta$ -Ketophosphinic Acids. Communication 4.  
Infrared Spectra of Reaction Products of  $\alpha$ -Halogen  
Ketones With Triethyl Phosphite and Sodium Diethyl Phosphite

SOV/62-59-2-13/40

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR  
(Physics Institute imeni P. N. Lebedev of the Academy of  
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A. M. Butlerova Kazanskogo gosudarstvennogo universiteta im.  
V. I. Ul'yanova-Lenina (Scientific Research Institute imeni  
A. M. Butlerov of the Kazan' State University imeni V. I.  
Ul'yanov-Lenin)

SUBMITTED: May 11, 1957

Card 3/3

5(0)

AUTHORS:

Arbuzov, B. A., Academician, Kiprianov, A. I., Academician of  
the AS UkrSSR

SOV/30-59-3-23/61

TITLE:

Congress on Chemical Engineering (Kongress po promyshlennoy  
khimii)

PERIODICAL:

Vestnik Akademii nauk SSSR, 1959, Nr 3, pp 82-85 (USSR)

ABSTRACT:

The XXXI International Congress took place in Liège, Belgium from September 7 to 12, 1958. It was attended by more than 1000 chemists and engineers of various countries. The Soviet delegation was represented by B. A. Arbuzov, G. A. Razuvayev, K. A. Kocheshkov, A. I. Kiprianov, S. I. Zav'yalov, and a number of scientists and engineers of scientific branch research institutes and enterprises of the chemical industry. The discussions covered the whole range of chemical engineering, from atomic metallurgy to pharmaceutical products. The Soviet chemists delivered the following reports: V. A. Kargin and M. N. Shteding reported on the inhibiting properties of stabilizers; K. A. Kocheshkov spoke of the effect of  $\gamma$ -radiation on the synthesis of organo-metallic stabilizers and catalysts for plastics; B. A. Arbuzov reported on the regeneration of carene and pinene oxides; A. I. Kiprianov and

Card 1/2

I 15/14

5 (3)

AUTHORS: Arbuzov, B. A., Zoroastrova, V. M. SOV/62-59-6-14/36

TITLE: The Esters of the Phosphoric- and Thiophosphoric Acid, Which Contain Heterocyclic Radicals (Efiry fosfornoy i tiofosfornoy kislot , soderzhashchiye geterotsiklicheskiye radikaly). Communication 2. Alkylation of Some Heterocyclic Compounds by Means of the Derivatives of the Phosphoric- and Phosphorous Acid (Soobshcheniye 2. Alkilirovaniye nekotorykh geterotsiklicheskikh soyedineniy proizvodnymi fosfornoy i fosforistoy kislot)

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 6, pp 1037 - 1040 (USSR)

ABSTRACT: In a previous paper (Ref 1) the authors described a series of esters of phosphoric and thiophosphoric acid with pyrimidine and imidomethyluracil radicals. The compounds obtained proved to be biologically highly active. The present paper is a continuation of the first one. The authors wanted to obtain esters of the phosphoric acids with heterocyclic radicals (thiacine, benzoxazole, and benzothiazole), and to investigate their properties. Besides the substances expected by the influence of dialkylphosphoric acid chloride upon the potassium

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The Esters of the Phosphoric- and Thiophosphoric Acid, SOV/62-59-6-14/36  
Which Contain Heterocyclic Radicals. Communication 2.  
Alkylation of Some Heterocyclic Compounds by Means of the Derivatives of  
the Phosphoric- and Phosphorous Acid

salts of 4,6,6-trimethyl-6H-1,3-thiazine-2-thiol (I), 2-mercaptobenzoxazole (II) and 2-mercaptobenzothiazole (III), also alkylation products were produced of thiol. In the experimental part the following reactions are described: 1) K-salts of (I) with acid chloride of diethyl phosphoric acid; 2) K-salts of (I) with acid chloride of the di-isobutyl phosphoric acid; 3) K-salts of (II) with acid chloride of the diethylphosphoric acid; 6) K-salts of (III) with acid chloride of the diethyl phosphoric acid. Alkylation products of thiol were in good yield obtained by reaction of trialkylphosphites on the disulphides of the above mentioned heterocyclic compounds; 4) Disulphide of benzoxazole with triethylphosphite; 5) 2-benzoxazole sulphenylchloride with triethylphosphite; 7) disulphide of benzo thiazole with triethylphosphite; 8) disulphide of benzo thiazole with the ethylester of the ethyleneglycol phosphoric acid. There are 5 references, 3 of which are Soviet.

Card 2/3

*Chemistry Inst. in A. M. Butlerov  
Kazan State Univ.*

5 (3)

AUTHORS:

Isayeva, Z. G., Arbuzov, B. A.

SOV/62-59-6-16/36

TITLE:

On the Reduction of the Oxides of  $\alpha$ -Pinene and of the Oxides of  $\Delta^3$ -Carene (O vosstanovlenii okisi  $\alpha$ -pinena i okisi  $\Delta^3$ -karena)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 6, pp 1049 - 1057 (USSR)

ABSTRACT:

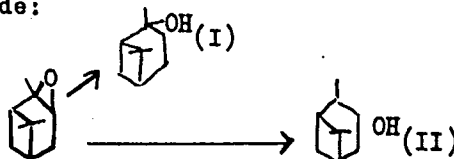
The reduction of the oxides mentioned in the title by lithium and aluminum hydride was not possible, what is proved by publications (Refs 1-17). In the present investigation the oxides could be reduced by hydrogen in the presence of Renay-nickel under sharp conditions.  $\alpha$ -pinene was reduced at 135-175° and a pressure of from 60-100 atmospheres,  $\Delta^3$ -carene at 175-200° and a pressure of from 50-80 atmospheres. The reduction of  $\alpha$ -pinene leads to the formation of 2 alcohols of the composition  $C_{10}H_{16}O$ . The hydration reaction was accompanied by an isomerization of the  $\alpha$ -pinene under formation of a ketone of the same composition, which is similar to the thermal isomerization and the oxidation products of the alcohol  $C_{10}H_{18}O$ . The ketone obtained by the thermal isomerization of  $\alpha$ -pinene oxide may be

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On the Reduction of the Oxides of  $\alpha$ -Pinene and of the SOV62-59-6-16/36  
Oxides of  $\Delta^3$ -Carene

reduced by lithiumaluminum hydride to  $C_{10}H_{18}O$  in 2 isomer alcohols which, however, are not identical with the alcohols obtained by reduction of  $\alpha$ -pinene oxide on Renay-nickel. Reduction of  $\alpha$ -pinene oxide:



Pinokampheol (II) and pinanol (I) are produced. The reduction of pinokamphon produced from hyssop oil on lithiumaluminum hydride also leads to an alcohol of the composition  $C_{10}H_{18}O$ , which differs from the aforementioned one. The  $\Delta^3$ -carene oxide is reduced on Renay-nickel to an alcohol of the composition  $C_{10}H_{18}O$ , which isomerizes into a ketone  $C_{10}H_{16}O$  when being heated. The different reductions are described in detail in the experimental part. A table gives the results of the thermal isomerization

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On the Reduction of the Oxides of  $\alpha$ -Pinene and of the SOV/62-59-6-16/36  
Oxides of  $\Delta^3$ -Carene

of  $\alpha$ -pinene. There are 1 table and 12 references, 1 of which is Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy institut im. A. M. Butlerova Kazan-  
skogo gosudarstvennogo universiteta im. V. I. Ul'yanova-Lenina  
(Scientific Research Institute imeni A. M. Butlerov of the  
Kazan' State University imeni V. I. Ul'yanov-Lenin)

SUBMITTED: August 15, 1957

Card 3/3

5(3)

AUTHORS:

Arbuzov, B. A., Zoroastrova, V. M., Saykina, M. K. SOV/62-59-9-10/40

TITLE:

Thermographic Studies of the Isomerization Reaction of the Glycol Phosphorous Acid Esters, Containing a Six-membered Ring, Under the Action of Alkyl Halides

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 9, pp 1579-1584 (USSR)

ABSTRACT:

The authors had carried out previous investigations similar to those mentioned in the title, in which they proved that the isomerization reaction proceeds in two phases. They also succeeded in finding information on the influence of the radical structure exerted on the capacity of the esters to isomerize (Arbuzov and Razumova, Ref 2). In the present paper the investigations are continued with the reaction of the esters of trimethylene glycol- (I) and  $\alpha$ -methyl trimethylene phosphorous acid (II) with alkyl halides. The methods of investigation were similar to those of reference 1. A pyrometer of the PK-52-type was used and butylphthalate was taken as standard. Table 1 contains the physical constants of the compounds investigated. Only one phase could be observed on the thermograms of the methyl-

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SOV/62-59-9-10/40

Thermographic Studies of the Isomerization Reaction of the Glycol Phosphorous Acid Esters, Containing a Six-membered Ring, Under the Action of Alkyl Halides

ethyl- and n-propyl esters of compounds (II) and the methyl- and benzyl esters of (I). The experimental data are shown on table 2 and figures 1-7. Herefrom the following could be concluded: the isomerization process of alkyl glycol esters with six-membered rings occurs under participation of the alkyl radical without destruction of the ring according to the scheme already earlier assumed by Arbuzov; a simultaneous formation of the esters of alkyl phosphinic acid takes place. The isomerization of the phenyl ester of (I) occurred unexpectedly also in one phase only, a ring opening was, however, observed in the analysis of the reaction products. A mixture of phenyl-γ-iodine propyl ester of methyl phosphinic acid forms when methyl iodide acts upon the phenyl ester of 1. In the isomerization reaction of the ethyl ester of pyrocatechol phosphorous acid with ethylbromide again only an exothermic effect was observed. A cyclic pyrocatechol ester of ethylphosphinic acid was formed, which is in accordance with the results of Arbuzov and Valitova (Ref 9). The ester radicals were therefore found to exert an influence on isomerization. There are 7 figures,

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SOV/62-59-9-10/40

Thermographic Studies of the Isomerization Reaction of the Glycol Phosphorous Acid Esters, Containing a Six-membered Ring, Under the Action of Alkyl Halides

3 tables, and 9 references, 7 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy institut khimii im. A. M. Butlerova Kazanskogo Gosudarstvennogo universiteta im. V. I. Ul'yanova-Lenina (Scientific Research Institute of Chemistry imeni A. M. Butlerov of the Kazan' State University imeni V. I. Ul'yanov-Lenin)

SUBMITTED: January 9, 1958

Card 3/3

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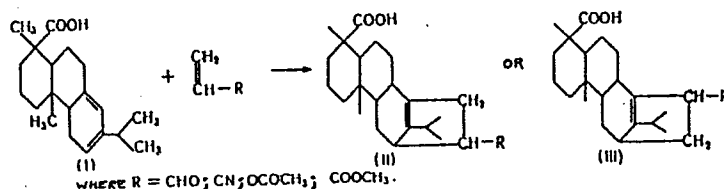
SOV/62-59-12-11/43

AUTHORS: Arbuzov, B. A., Khismatullina, A. G.

TITLE: Diels-Alder Synthesis With Levopimaric Acid

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 12, pp 2126-2129 (USSR)

ABSTRACT: Crude resin acids of the galipot, *Pinus maritima*, containing 40% levopimaric acid, were condensed with acrolein, acrylonitrile, vinyl acetate, and methyl acrylate, in dry ether under carbon dioxide at 40-60°, in sealed tubes. The obtained products were purified as cyclohexylamine or diacetoneamine salts:



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Diels-Alder Synthesis With Levopimaric  
Acid

77067

SOV/62-59-12-11/43

It was not determined whether the products had structure (II) or (III). The acrolein adduct, regenerated from the amine salt with boric acid, had mp 50-62°,  $[\alpha]_D = +37.5^\circ$  (all rotation measurements were made in ethanol); it formed a semicarbazone, mp 216-218°,  $[\alpha]_D = -8.7^\circ$ . The acrylonitrile adduct, similarly obtained, had mp 80-90°,  $[\alpha]_D = -12.5^\circ$ . The vinyl acetate adduct, after regeneration, had mp 67-83°,  $[\alpha]_D = -26^\circ$ , neutralization equivalent, 103 (calculated, 103). The methyl acrylate adduct, after repeated recrystallization from aqueous ethanol, had mp 134-138°. The results of elemental analysis, in all cases, were in good agreement with calculated percentages. There are 2 figures; and 7 references, 3 Soviet, 2 Swiss, 1 German, 1 U.S. The U.S. reference is: G. C. Harris, J. Am. Chem. Soc., 11, 3671 (1948).

Card 2/3

Diels-Alder Synthesis With Levopimaric  
Acid

77067

SOV/62-59-12-11/43

ASSOCIATION: V. I. Ul'yanov-Lenin Kazan State University (Kazanskiy  
gosudarstvennyy universitet imeni V. I. Ul'yanova-  
Lenina)

SUBMITTED: April 24, 1958

Card 3/3



5.3400

77068

SOV/62-59-12-12/43

AUTHORS:

Arbusov, B. A., Konovalov, A. I.

TITLE:

The Diels-Alder Synthesis. Communication 1. The Spectrophotometric Study of the Diels-Alder Synthesis

PERIODICAL:

Izvestiya Akademii nauk, SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 12, pp 2130-2134 (USSR)

ABSTRACT:

The purpose of this work was to test the assumption that D. A. reagents (dienes and dienophiles) may reversibly form molecular compounds, which may then react irreversibly. The absorption spectra of the molecular compounds are determined by an intermolecular charge transfer and should be found in the visible or the ultraviolet region of the spectrum. The absorption of chloroform solutions was measured on a SF-4 spectrophotometer. Concentrations giving the optimum optical density values (1 cm cell) were used (in the order of 0.001 M in maleic anhydride). The following conclusions were made on the basis of spectral investigations: Formation of molecular compounds

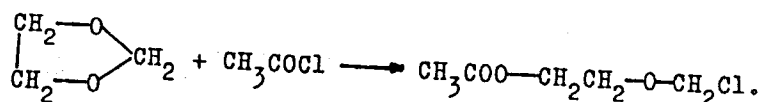
Card 1/2

SUBMITTED:

May 14, 1958

Card 2/2

AUTHORS: Arbuzov, B. A., Ukhvatova, E. N. SOV/79-29-2-30/71  
 TITLE: Synthesis of the Esters of Some Phosphinic Acids and Phosphoric Acid (Sintez efirov nekotorykh fosfinovykh i fosfornoy kislot)  
 PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 2, pp 503-507 (USSR)  
 ABSTRACT: According to an American patent (Ref 1) dioxolanes are readily cleft by the action of acyl chlorides into the acyl derivatives of oxyhalogen ethers



It was not confirmed that also other halogen anhydrides break the dioxolane ring (as shown e.g. in scheme 2). The uncomplicated synthesis of  $\beta$ -acetoxyethyl chloro-methyl ether induced the authors to use this ether also for the synthesis of phosphinates. It results from the experiment that the complete esters of phosphorus acid readily react with  $\beta$ -acetoxyethyl chloro-methyl ether (Scheme 3). The constants of the esters obtained are listed in the table. Many thiophosphoric esters proved to be insecticides, yet the authors did not succeed in obtaining

Card 1/2

## Synthesis of the Esters of Some Phosphinic Acids and Phosphoric Acid SOV/79-29-2-30/71

esters of thiophosphoric acid with a  $\beta$ -acetoxy ethoxy-methyl radical in pure state. The esters of phosphoric and thiophosphoric acid with heterocyclic radicals as insecticides are of great interest (Ref 2). Therefore, the authors synthesized phosphates with thiazole and thiodiazole radicals. On the action of chloric anhydride of diethyl phosphoric acid on the sodium salt of 4-methyl-2-oxy thiazole the authors obtained a mixed ester of phosphoric acid in good yield (Scheme 4). By the reaction of the chloric anhydride of diethyl phosphoric acid with 4-methyl-2-amino thiazole the corresponding substituted amide was obtained (Scheme 5). The accessibility of 2,5-dimercapto thio-3,4-diazole (Ref 4) induced the authors to cause it to react with the chloric anhydride of diethyl phosphoric acid according to scheme 6. According to the results of analysis this formation is probable. There are 1 table and 5 references, 3 of which are Soviet.

Card 2/3

*Sci Res Chemistry Inst, Kazan State U.*

5(3)

SOV/79-29-8-36/81

AUTHORS: Arbuzov, B. A., Bogonostseva, N. P.

TITLE: Syntheses on the Basis of Ethyl-oxy-methyl-phosphinic Acid

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 8, pp 2617-2622 (USSR)

ABSTRACT: The authors investigated the reactions of the compound  $(C_2H_5O)_2POCH_2ONa(I)$  most useful for this purpose, with the acid chloride of the diethyl-phosphoric acid, the ethyl ester of the chloroacetic and chlorocarboxylic acid, the chlorohydrin of ethylene glycol, silicon tetrachloride, phosphorus trichloride, phosgene and thionyl chloride. The first four reactions proceeded normally. With the acid chloride of the diethyl phosphoric acid, the diethyl phosphate of the ethyl-oxy-methyl-phosphinate was obtained according to scheme 1. With ethyl-chloroacetate, the reaction yielded the  $\alpha$ -diethyl-phosphono- $\alpha'$ -carbethoxy-dimethyl ester (Scheme 2). With ethyl-chlorocarbonate, the composition approaches the ethyl-ethoxy-methyl phosphinate  $(C_2H_5O)_2POCH_2OC_2H_5$  (Ref 2) under evolution of carbon dioxide, and diethyl carbonate separates out (Scheme 3). With the chlorohydrin of ethylene glycol, the ethyl-oxy-methyl phosphinate was obtained (confirmed by the analysis). The reaction with  $SiCl_4$  and  $PCl_3$  gave no de-

Card 1/2

Syntheses on the Basis of Ethyl-oxy-methyl-phosphinic Acid SOV/79-29-8-36/81  
finite products, with the exception of ethyl-oxy-methyl phosphinate. The reaction with phosgene yielded a liquid product which neither corresponds with compound (II) nor (III), but is more closely allied to (II) (Scheme 4). In the reaction with thionyl chloride, the following compounds were separated: diethyl sulfite, triethyl phosphate, ethyl-oxy-methyl phosphinate, and two more products which correspond with the formulas  $C_6H_{20}O_7P_2$  and  $C_6H_{14}O_6P_2$ . To the first liquid product, structure (IV) could possibly be assigned; the second crystalline product corresponds with structure (V). The structure of compound (V) was confirmed by its synthesis by means of ring closure from two molecules of ethyl-oxy-methyl phosphinate, or of its acetate on heating with sodium alcoholate. There are 5 references, 2 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy khimicheskiy institut pri Kazanskom gosudarstvennom universitet (Scientific Chemical Research Institute, Kazan' State University)

SUBMITTED: June 9, 1958

Card 2/2

5(3)

AUTHORS: Vil'chinskaya, A. R., Arbuzov, B. A. SOV/79-29-8-61/81

TITLE: Diene Synthesis of Alloocimene With Asymmetric Dienophils

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 8, pp 2718-2723 (USSR)

ABSTRACT: It was proved by the authors (Ref 1) and at the same time by other research workers (Refs 2, 3) that the diene synthesis of alloocimene with the anhydride of maleic acid takes place at the carbon atoms 4,7 (Scheme 1). In the case of asymmetric dienophils the affiliation to the atoms 4,7 can yield two isomers (II) and (III) for alloocimene (Scheme 2). No definite data are to be found in publications as to whether this synthesis yields (II) or (III) or a mixture of both (Refs 2, 4). In order to determine the structure of the products of the diene synthesis of alloocimene with asymmetric dienophils with regard to the question whether the results are (II) or (III), the synthesis of alloocimene with acrolein, methyl acrylate, and the nitrile of acrylic acid was carried out and their structures were determined. The structure of the product of alloocimene and acrolein obtained earlier by B. A. Arbuzov (Ref 5) was determined by dehydrogenation over the palladium catalyst. The result was a crystalline compound which

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Diene Synthesis of Alloocimene With Asymmetric  
Dienophils

SOV/79-29-8-61/81

according to its melting point and that of its picrate as well as its ultraviolet spectrum, proved to be the 2,3,6-trimethyl-naphthalene (Fig). This formation proves that the structure of the adduction of alloocimene with acrolein is (II, X=CHO) (Scheme 3). The reaction of alloocimene with the methylacrylate yielded an adduct with an 81,5% yield. The structure of the esters as compound (II) (X=COOCH<sub>3</sub>) was proved according to

scheme 4. In the dehydrogenation of the adduct over the palladium catalyst the ester (IV) was obtained, and when (IV) was saponified the free acid (V) resulted. Its oxidation yielded the pyromellitic acid which was identified in the form of its esters (VI) (Ref 10). Compound (VII) resulted from the dehydrogenation of the adduct of alloocimene with methylacrylate by means of sulphur and sodium sulphite. The nitrile of acrylic acid smoothly reacts with alloocimene. The structure of the resulting adduct as compound (II) (X=CN) was proved according to scheme 5. Thus the affiliation of the dienophil takes place in the case of the above diene syntheses with a formation of the

Card 2/3

Diene Synthesis of Alloocimene With Asymmetric  
Dienophils

SOV/79-29-8-61/81

adduct (II). The formation of adduct (III) in other cases is, however, not impossible. There are 1 figure and 13 references, 6 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy khimicheskiy institut pri Kazanskom gosudarstvennom universitete and Kazanskiy gosudarstvennyy meditsinskiy institut (Scientific Research Institute of Chemistry at the Kazan' State University and Kazan' State Medical Institute)

SUBMITTED: June 16, 1958

Card 3/3



5 (2, 3)

## AUTHORS:

Arbuzov, B. A., Academician,  
Vinokurova, G. M., Perfil'yeva, I. A.

SOV/20-127-6-20/51

TITLE: Addition of Phenylphosphine to Unsaturated Compounds

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 6, pp 1217-1220  
(USSR)

ABSTRACT: After a survey of publications (Refs 1-4), the authors indicate brief results of their investigations made in recent years on the addition mentioned in the title: they intended to obtain bifunctional, phosphorus-containing compounds. It has become evident that phenylphosphine, in the presence of a catalyst and on heating, can be easily added to the acrylic- and methacrylic-acid esters. Besides the addition products, small quantities of oxides of the corresponding phosphines are produced by oxidation of the tertiary phosphines forming. The addition of phenylphosphine to allyl alcohol proceeds under the influence of catalysts which produce free radicals (of the dinitryl-azo-bis-isobutyric acid, see Equation). Table 1 shows the compounds obtained and their constants. For obtaining various derivatives, the authors repeated the experiments by Mann (Ref 3). Here,  $\beta$ -cyano-ethyl-phenylphosphine, di-( $\beta$ -cyano-ethyl)-phenylphosphine, and the oxide

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Addition of Phenylphosphine to Unsaturated Compounds

SOV/20-127-6-20/51

of the latter, were isolated. By a reduction of the di-( $\beta$ -cyano-ethyl)-phenylphosphine by means of lithium aluminum hydride, di-( $\beta$ -amino-propyl)-phenylphosphine was produced. The tertiary phosphines obtained are easily oxidized by the atmospheric oxygen (as derivatives of trivalent phosphorus) into the corresponding phosphine oxides, and can also add sulphur. Table 2 shows constants of the 3 last-mentioned compounds obtained. Finally, the authors carried out the interaction reactions of phenylphosphine with acrolein, methacrylic acid, ethylene oxide, and allyl bromide. There are 2 tables and 5 references.

ASSOCIATION: Institut organicheskoy khimii Kazanskogo filiala Akademii nauk SSSR (Institute of Organic Chemistry of the Kazan' Branch of the Academy of Sciences, USSR)

SUBMITTED: June 5, 1959

Card 2/2

5(3)

AUTHORS: Arbuzov, B. A., Academician, SOV/20-128-1-21/58  
Vinogradova, V. S., Polezhayeva, N. A.

TITLE: Diethyl Ester of Cyclohexanone-2-Phosphinic Acid

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 1, pp 81-84  
 (USSR)

ABSTRACT: In the present paper the authors synthesized the diethyl ester of cyclohexanone-2-phosphinic acid on the basis of  $\alpha, \alpha'$ -dibromo cyclohexanone. By reaction of triethyl phosphite upon  $\alpha, \alpha'$ -dibromo cyclohexanone the diethyl phosphinic ester of the enol form of cyclohexanone-2-phosphinic ester (III) was obtained with the following constants: boiling point  $172.5 - 173^{\circ}/2.5$  mm;  $d_4^{20}$  1.1885;  $n_D^{20}$  1.4652. This compound was converted into the diethyl ester of cyclohexanone-2-phosphinic acid by means of ethyl alcohol. The molecular refraction of cyclohexanone phosphinic ester is placed between the values which were computed for the ketone- (IV) (57.06) and for the enol form (V) (58.11). Figure 1 shows its ultraviolet absorption spectra in aqueous solution (curve 1) in methyl alcohol solution (curve 2) and in isooctane (curve 3). Figure 2

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Diethyl Ester of Cyclohexanone-2-Phosphinic Acid

SOV/20-128-1-21/58

gives the ultraviolet absorption spectrum in methyl alcohol solution with content of sodium methyrate. With the example of the diethyl ester of cyclohexanone-2-phosphinic acid it was demonstrated that a ketoenol tautomerism may occur in phosphinic esters containing a group of ketones in  $\beta$ -position within the hydrocarbon radical present in phosphorus. There are 2 figures and 8 references, 3 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy institut im. A. M. Butlerova Kazanskogo gosudarstvennogo universiteta im. V. I. Ul'yanova-Lenina (Scientific Research Institute imeni A. M. Butlerov of the Kazan State University imeni V. I. Ul'yanov-Lenin)

SUBMITTED: June 5, 1959

Card 2/2

ROBINZON, Yelizaveta Abelevna. Prinimal uchastiye BOGORODSKAYA, K.A.,  
nauchnyy sotrudnik. ARBUZOV, B.A., akademik, otv.red.;  
MIYESSEROV, K.G., red.izd-va; DOROKHINA, I.N., tekhn.red.

[Petroleum in the Tatar A.S.S.R.] Nefti Tatarskoi ASSR. Izd.2.,  
perer. i dop. Moskva, Izd-vo Akad.nauk SSSR, 1960, 273 p.

(MIRA 13:8)

1. Sektor geologii neftyanykh mestorozhdeniy Kazakhstanskogo  
filiala Akademii nauk SSSR (for Bogorodskaya).  
(Tatar A.S.S.R.--Petroleum)

5.3400

78066  
SOV/62-60-1-12/37

AUTHORS: Arbuzov, B. A., Konovalov, A. I.

TITLE: Diels-Alder Synthesis. Communication 2. The Spectrophotometric Study of the Diels-Alder Synthesis of p-Benzoquinone and  $\alpha$ -Naphthoquinone

PERIODICAL: Izvestiya Akademii nauk. Otdeleniye khimicheskikh nauk, 1960, Nr 1, pp 68-72 (USSR)

ABSTRACT: Spectrophotometric studies indicate that in the reactions of p-benzpquinone with cyclopentadiene, isoprene, and piperilene, the formation of monoadducts as well as bis-adducts is preceded by formation of intermediates. In the case of isoprene and piperilene, the reaction, at room temperature, stops at the stage of the monomolecular complex of the mono-adduct with the diene. The reaction of  $\alpha$ -naphthoquinone involves an intermediate. In solutions of  $\alpha$ -naphthoquinone in isoprene and piperilene there is no absorption indicating the presence of any intermediate complex. This can be explained by the assumption that the rate of conversion of the

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Card 1/2

AUTHOR: Arbuzov, B. A.; Academician S/030/60/000/03/033/044  
BO15/BO07  
TITLE: The Chemistry of Organophosphorus Compounds and Their Use  
PERIODICAL: Vestnik Akademii nauk SSSR, 1960, Nr 3, pp 103 - 105 (USSR)

TEXT: The Second Conference on the Chemistry and Use of Organophosphorus Compounds was held in Kazan' from November 26 to December 1, 1959. It was attended by more than 400 chemists, physiologists, physicians, entomologists, and agronomists. Altogether, 122 lectures were delivered. B. A. Arbuzov spoke about the development of the chemistry of organophosphorus compounds in the past five years. M. I. Kabachnik dealt with the influence exerted by molecular structure and reactivity. Ye. L. Gelter discussed the use of organophosphorus compounds in the industry of high-polymer compounds. M. Ya. Mikhel'son, E. V. Zeymal', and N. K. Fruyentov spoke about the chemical mechanism of the interaction between organophosphorus compounds and cholinesterases. Problems of the tautomerism of organophosphorus compounds were discussed by T. A. Mastryukova, S. T. Ioffe, V. S. Vinogradova, and V. A. Gilyarov. A. V. Kirsanov, N. N. Mel'nikov, I. F. Lutsenko, A. N. Pudovik, G. Kh. Kamay, B. A. Arbuzov, V. S. Abramov, and A. I. Razumov spoke about synthetic research concerning the preparation of organic derivatives of various types. The lectures held by V. V. Korshak, M. I. Kabachnik, T. Ya. Medved', G. Kh. Kamay, Ye. V. Kuznetsov, G. M. Vinokurova,

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The Chemistry of Organophosphorus Compounds and Their Use S/030/60/000/03/033/044  
B015/B007

G. S. Kolesnikov, P. I. Sanin, A. I. Kreshkov, M. G. Voronkov, A. A. Kropacheva, S. I. Sergiyevskaya, L. Kh. Protsenko, and N. P. Grechkin were devoted to problems of the synthesis of organophosphorus compounds which are capable of polymerization and polycondensation. V. A. Yakovlev, Yu. S. Kogan, I. A. Frankova, G. F. Rzhevskaya, I. V. Zaikonnikova, and L. S. Afonskaya reported on the research of the interaction between the chemical structure and biological activity of organophosphorus compounds. N. K. Fruyentov, V. N. Asekritova, V. V. Mozhukhina, I. M. Rakhmatullin, and V. M. Sirotkin spoke about the influence exercised by organophosphorus compounds upon nervous-muscular transmission. The lectures delivered by V. M. Krasnova, Z. M. Osipova, and G. I. Timinskaya dealt with the use of organophosphorus compounds for treating glaucoma. L. V. Chugunova and N. A. Korchagina explained the use of such compounds for the preparation of birth-stimulating agents. I. D. Neklesova spoke about the treatment of experimental trichophytosis of animals. A. K. Voskresenskaya's lecture dealt with the research of the "cholinergic" system of insects and with the mechanism of insecticidal action of organophosphorus compounds. Data on the biological action of organophosphorus compounds on pest, plants, and soil microflora were given by A. M. Alekseyev, P. V. Sazonov and Ye. N. Kozlova held a lecture on the use of these compounds for protecting corn and cotton. The resolutions adopted by

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The Chemistry of Organophosphorus Compounds and Their Use S/030/60/000/03/033/044  
B015/B007

the Conference emphasized the great importance of the chemistry of phosphorous high-molecular compounds. It was found to be necessary to convene conferences on the chemistry and use of organophosphorus compounds every three years. It was recommended to extend research work in the field of biochemistry, physiology, and toxicology of organophosphorus compounds. ✓

Card 3/3

ARBUZOV, B.A.; VINOGRADOVA, V.S.; POLEZHAYEVA, N.A.

Esters of  $\beta$ -ketophosphonic acids. Report No.5: Structure of the products of the interaction between certain  $\alpha$ -halo ketones of the carbocyclic series, triethyl phosphite, and sodium diethyl phosphite. Izv.AN SSSR Otd.khim.nauk no.5:832-841  
My '60. (MIRA 13:6)

1. Khimicheskiy institut imeni A.M. Butlerova Kazanskogo gosudarstvennogo universiteta.  
(Ketones) (Phosphorous acid)

S/062/60/000/006/017/025/XX  
B020/B060

AUTHORS: Arbuzov, B. A. and Zoroastrova, V. M.

TITLE: Synthesis of Phosphinic Acid Esters<sup>1</sup> Containing Heterocyclic Radicals. Communication 6. Interaction of Phosphorous Acid Esters With Furfurol<sup>1</sup>, Pyromucic Acid, and Furyl Acrylic Acid<sup>1</sup> ✓

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1960, No. 6, pp. 1030-1034

TEXT: Papers by G. Kamay and V. A. Kukhtin (Ref. 1) have shown that neutral esters of phosphorous acid are added to  $\alpha, \beta$ -unsaturated aldehydes, giving rise to phosphinic acid esters. Conjugate systems with a larger number of double bonds were expected to be likewise capable of a similar addition. Similar systems are found in aldehydes and acids of the furan series. By the addition of trialkyl phosphites thereto, one obtains esters of phosphinic acids with substituted furan or dihydro furan radical. On heating triethyl phosphite and triisopropyl phosphite with furfurole at

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Synthesis of Phosphinic Acid Esters  
Containing Heterocyclic Radicals.  
Communication 6. Interaction of Phosphorous  
Acid Esters With Furfurole, Pyromucic Acid,  
and Furyl Acrylic Acid

S/062/60/000/006/017/025/XX  
B020/B060

160° the phosphite was oxidized to phosphate, namely by the oxygen of the aldehyde group. Small amounts of difuryl ethane were separated from the reaction products for a melting point of 100 - 101°. Trialkyl phosphite thus behaves as an oxygen acceptor and takes this oxygen from the aldehyde group. The interaction of triethyl phosphite with benzaldehyde under more rigorous conditions was experimentally observed. Also in this case, apart from the addition product of triethyl phosphate to the aldehyde group, the reaction described by V. S. Abramov (Ref. 2) yielded trialkyl phosphate and small amounts of stilbene for a melting point of 124 - 125°. The oxygen removal by means of phosphite, described in the article under consideration, has an analogy in the removal of sulfur from mercaptans and disulfides (Refs. 3, 4). On heating triethyl phosphite or triisopropyl phosphite with pyromucic acid at 130 - 160°, ethyl- or isopropyl esters of pyromucic acid were separated from the reaction products. The course of the reaction between triethyl phosphite and furyl

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Synthesis of Phosphinic Acid Esters  
Containing Heterocyclic Radicals.  
Communication 6. Interaction of Phosphorous  
Acid Esters With Furfurole, Pyromucic Acid,  
and Furyl Acrylic Acid

S/062/60/000/006/017/025/XX  
B020/B060

acrylic acid has a complicated character. Separated were diethyl phosphorous acid, ethyl ester of furyl acrylic acid, and a product identified as the addition product of triethyl phosphite to furyl acrylic acid. The reaction of triethyl phosphite with furfurole was performed in Arbuzov's flask. The individual reactions, the products, and their characteristics are described. There are 5 references: 2 Soviet and 3 US.

ASSOCIATION: Nauchno-issledovatel'skiy khimicheskiy institut im. A. M. Butlerova Kazanskogo universiteta (Scientific Research Institute of Chemistry imeni A. M. Butlerov of Kazan' University)

SUBMITTED: October 12, 1958

Card 3/3

S/062/60/000/006/021/025/XX  
B020/B060

AUTHORS: Arbuzov, B. A. and Nikitina, V. I.

TITLE: Addition of Carbon Tetrachloride<sup>1</sup> to Divinyl<sup>1</sup> and Piperylene<sup>1</sup>

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk,  
1960, No. 6, pp. 1131-1133 ✓

TEXT: Carbon tetrachloride has been earlier found to be added to olefins under the action of peroxide catalysts or ultraviolet light. The authors carried out experiments with the addition of carbon tetrachloride to divinyl and piperylene in the presence of benzoyl peroxide. Butadiene was heated with  $\text{CCl}_4$  in the autoclave to 120 - 130°, which resulted in an appreciable resin formation. Three principal products and a small amount of a further product of composition  $\text{C}_5\text{H}_4\text{Cl}_2$  were found, the last mentioned being formed by the separation of two HCl molecules from the addition product  $\text{CCl}_4$  - butadiene. The principal products are 1,1,1,5-tetrachloro pentene-3 and 1,1,1,9-tetrachloro nonanediene-3,7, the structure of which was proved. 1-chloro-4-methyl-5,5,5-trichloro pentene-2

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Addition of Carbon Tetrachloride to  
Divinyl and Piperylene

S/062/60/000/006/021/025/XX  
B020/B060

is formed on the addition of  $\text{CCl}_4$  to piperylene. The addition of  $\text{CCl}_4$  to divinyl and piperylene thus takes place in the 1,4-position. There are 3 non-Soviet references: 1 US and 2 British.

ASSOCIATION: Kazanskiy gosudarstvennyy universitet im. V. I.  
Ul'yanova-Lenina (Kazan' State University imeni V. I.  
Ul'yanov-Lenin)

SUBMITTED: November 21, 1959

Card 2/2

53630

2209, 1266, 1287

86411  
S/062/60/000/008/019/033/XX  
B013/B055

AUTHORS:

Arbuzov, B. A. and Dianova (Ukhvatova), E. N.

TITLE:

2-Cyclopentenyl-1-phosphinic Acid Esters and Some Derivatives

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk,  
1960, No. 8, pp. 1399-1404

TEXT: The effect of trialkyl phosphites and sodium dialkyl phosphites on 3-chloro 1-cyclopentene was studied in the present paper. Treatment of 3-chloro 1-cyclopentene with triethyl phosphite did not yield the desired result: The reaction did not take place at lower temperatures, while at 120° C cyclopentadiene formed in quantitative yield by elimination of hydrogen chloride. With triethyl phosphite, the latter gave ethyl chloride and sodium diethyl phosphite, the latter gave ethyl chloride and sodium diethyl phosphite, however, gave the expected cyclopentenyl phosphinic acid ester. By similar reactions, other esters of 2-cyclopentenyl acetyl hydroperoxide were obtained. These esters are readily oxidized by oxidation of the 2-cyclopentenyl 1-phosphinic acid n-butyl and isobutyl esters by acetyl hydroperoxide, gave besides the oxides also higher-

Card 1/2



ARBUZOV, B.A.; YARMUKHAMEDOVA, D.Kh.

Organophosphorus derivatives of phenothiazine. Izv.AN SSSR.Otd.  
khim.nauk no.8:1405-1408 Ag '62. (MIRA 15:8)

1. Khimicheskiy institut im. A.Ye.Arbuzova.  
(Phenothiazine) (Phosphorus organic compounds)

84851

5.3630

2209, 1287, 1153

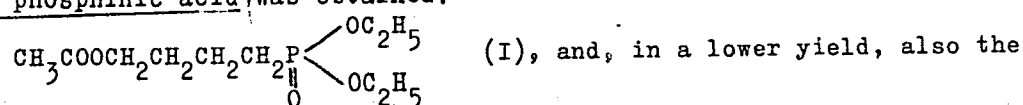
S/062/60/000/010/004/018  
B015/B064

AUTHORS: Arbuzov, B. A. and Yarmukhametova, D. Kh.

TITLE: Synthesis of Heterocyclic Compounds With Phosphorus in the Cycle. Information 1. Synthesis of the Derivatives of Oxa- and Dioxaoxydophosphorinane.

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1960, No. 10, pp. 1767-1771

TEXT: Data are given on the synthesis of phosphinic acid derivatives that are analogous to the lactones, with the intramolecular cyclization being carried out by esterification. In the reaction between  $\delta$ -bromobutyl acetate and triethyl phosphite, the diethyl ester of (4-acetoxybutyl) phosphinic acid was obtained: X



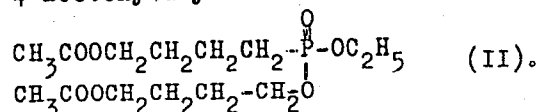
Card 1/4

84851

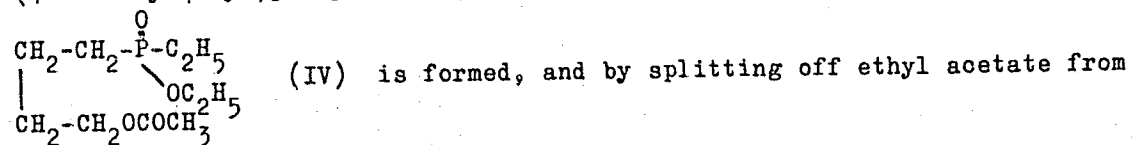
Synthesis of Heterocyclic Compounds With  
Phosphorus in the Cycle. Information 1.  
Synthesis of the Derivatives of Oxa- and  
Dioxaoxydophosphorinane

S/062/60/000/010/004/018  
B015/B064

4-acetoxybutyl ester of this acid:



Heating (in the presence of a low amount of phosphoric acid as a catalyst) causes a cyclization under the action of  $\delta$ -bromobutyl acetate upon the diethyl ester of ethyl phosphinous acid; thus, the ethyl ester of (4-acetoxy butyl)phosphinic acid:



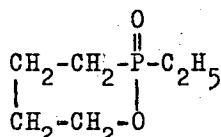
the latter, 6-oxa-1-ethyl-1-oxydo-1-phosphorinane is obtained:

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84851

Synthesis of Heterocyclic Compounds With  
Phosphorus in the Cycle. Information 1.  
Synthesis of the Derivatives of Oxa- and  
Dioxaoxydophosphorinane

S/062/60/000/010/004/018  
B015/B064



(V). By the action of triethyl phosphite and the

diethyl ester of ethyl phosphinous acid upon the methyl chloride of  $\beta$ -acetoxy ethyl ester, the esters (VII) and (VIII) of the corresponding phosphinic acids were obtained in the same way. By splitting off ethyl acetate from (VII), 3,6-dioxa-1-ethoxy-1-oxydo-1-phosphorinane (IX) was obtained, and by splitting off ethyl acetate from the second ester (VIII), 3,6-dioxa-1-ethyl-1-oxydo-1-phosphorinane (X) was obtained. Table 1 gives the constants of the phosphinic acid esters, and Table 2 the constants of the cyclization products. The course of preparation is described for each of the substances. There are 2 tables and 9 references: 3 Soviet and 6 US.

Card 3/9 *Chem. Ind. in A.Ye. Arbuzov, Kazan' Branch AS USSR*

5.3630

2203, 1153, 1266

84852

S/062/60/000/010/005/018

B015/B064

AUTHORS: Arbuzov, B. A., Vinogradova, V. S., and Zvereva, M. A.

TITLE: Esters of  $\beta$ -Ketophosphinic Acids. Information 6. Products of the Reaction of Chloro- and Bromo Acetones With the Diethyl Ester of Ethyl Phosphinous Acid and With the Sodium Salt of the Monoethyl Ester of Ethyl Phosphinous Acid

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1960, No. 10, pp. 1772-1778

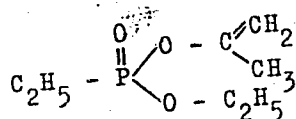
TEXT: The investigations mentioned in the title were carried out to determine the effect of an exchange of an ethyl radical directly bound to phosphorus for the ethoxyl radical in triethyl phosphite, or in diethyl phosphorous sodium. The reaction between chloroacetone and the diethyl ester of ethyl phosphinous acid led to the mixed ethyl isopropenyl ester of ethyl phosphinous acid: X

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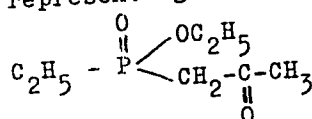
Esters of  $\beta$ -Ketophosphinic Acids. Information  
6. Products of the Reaction of Chloro- and  
Bromo Acetones With the Diethyl Ester of  
Ethyl Phosphinous Acid and With the Sodium  
Salt of the Monoethyl Ester of Ethyl  
Phosphinous Acid

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B015/B064



(I). Two products resulted from the reaction of

bromo acetone with the diethyl ester of ethyl phosphinous acid, and it was found that one of them corresponded to ester (I), and the other product was a mixture yielding two substances after distillation, one representing the ethyl ester of ethyl acetyl phosphinic acid,



(II), and the other following one of the two

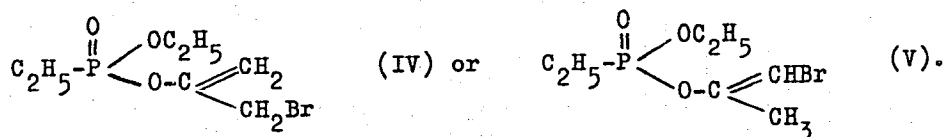
formulas:

Card 2/4

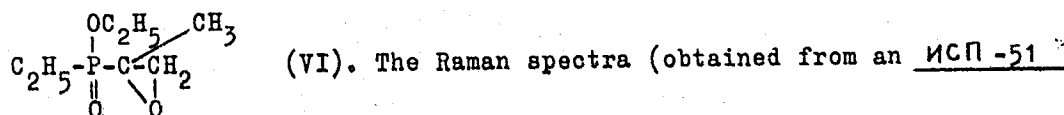
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Esters of  $\beta$ -Ketophosphinic Acids. Information  
6. Products of the Reaction of Chloro- and  
Bromo Acetones With the Diethyl Ester of  
Ethyl Phosphinous Acid and With the Sodium  
Salt of the Monoethyl Ester of Ethyl  
Phosphinous Acid

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B015/B064



It is, however, necessary to carry out further investigations to verify one of the two last-mentioned formulas. The reaction between chloro acetone and the sodium salt of the monoethyl ester of ethyl phosphinous acid leads to the ethyl ester of ethyl epoxy isopropyl phosphinic acid:



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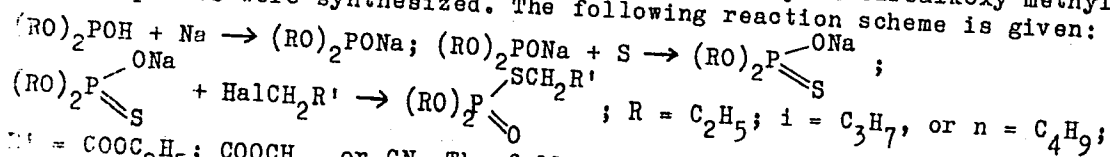
S/062/60/000/010/028/031/XX  
B004/B060

AUTHORS: Arbuzov, B. A. and Yarmukhametova, D. Kh.

TITLE: Synthesis of Some Esters of Thiophosphoric Acid

SYNOPSIS: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1960, No. 10, pp. 1881-1883

ABSTRACT: The authors attempted to obtain insecticides and physiologically active esters of thiophosphoric acid. Six O,O-dialkyl-S-carbalkoxy methyl thiophosphates were synthesized. The following reaction scheme is given:

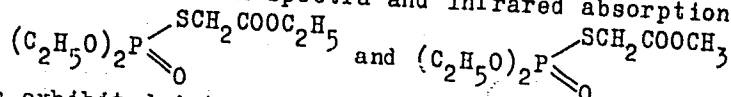


$R' = COOC_2H_5; COOCH_3, \text{ or } CN.$  The following synthesis is described for diethyl carbethoxy methyl thiophosphate: one hour of heating of sodium diethyl phosphite in benzene solution with sulfur; addition of bromo acetic ester drops to the salt precipitate; two hours of heating, filtering off, evaporation of



Synthesis of Some Esters of Thiophosphoric Acid S/062/60/000/010/028/031/XX  
B004/B060

benzine, and distillation in vacuum. Raman spectra and infrared absorption spectra of the compounds:



were taken. Both compounds exhibited intensive infrared absorption bands at 1260 - 1266  $\text{cm}^{-1}$ , which are characteristic of the P=O bond. The Raman spectrum showed no lines at 600  $\text{cm}^{-1}$ , that might point to a P=S bond. Both in the said two compounds and in  $(\text{C}_2\text{H}_5\text{O})_2\text{P}(=\text{O})\text{SCH}_2\text{CN}$ , an insecticidal effect was established. Acaricidal and antiglaucomatous effects of resulting esters are still being examined. A paper by M. I. Kabachnik is mentioned. There are 1 table and 2 Soviet references.

ASSOCIATION: Khimicheskiy institut im. A. Ye. Arbuzova Kazanskogo filiala Akademii nauk SSSR (Chemical Institute imeni A. Ye. Arbuzov of the Kazan' Branch of the Academy of Sciences USSR)

SUBMITTED: March 11, 1960

Card 2/2

ARBUZOV, B.A.; VINOGRADOVA, V.S.; ZVEREVA, M.A.

Esters of  $\beta$ -keto phosphonic acids. Report No.7: Products of the reaction of  $\alpha$ -chlorocyclohexanone with diethyl ester of ethylphosphonous acid and the sodium salt of the monoethyl ester of ethylphosphonous acid. Izv. AN SSSR.Otd. khim. nauk no.11:1981-1984 N '60.  
(MIRA 13:11)

1. Khimicheskiy institut Kazanskogo filiala AN SSSR i Khimicheskiy institut im. A.M.Butlerova Kazanskogo universiteta im. V.I.Ul'yanova-Lenina.

(Cyclohexanone) (Phosphonous acid)

ARBUZOV, B.A., akademik; ISAYEVA, Z.G.; RATNER, V.V.

Products of the autoxidation of  $\Delta^3$ -carene. Dokl. AN SSSR 134 no.3:  
583-586 S '60. (MIRA 13:9)

1. Nauchno-issledovatel'skiy khimicheskiy institut im. A.M. Butlerova  
pri Kazanskom gosudarstvennom universitete im. V.I. Ul'yanova-Lenina.  
(Carene)

ARBUZOV, B.A.; ZORASTROVA, V.M.

Esters of phosphoric and thiophosphoric acids containing heterocyclic radicals. Report No. 3: Compounds with tetrahydrofurfuryl radicals. Izv. AN SSSR. Otd. khim. nauk no. 1:51-55 Ja '61.  
(MIRA 14:2)

1. Khimicheskiy institut im. A.M. Butlerova Kazanskogo gosudarstvennogo universiteta im. V.I. Ul'yanova-Lenina.  
(Phosphoric acid) (Furfuryl alcohol) (Phosphorous acid)